

REMARKS

Claims 1-22 are pending in the application. Claims 2-14 have been withdrawn from consideration pursuant to a restriction requirement. Claims 1 and 15-22 have been examined and rejected on prior art grounds.

Applicants thank the Examiner for the indication that the drawings submitted on March 2, 2006 have been accepted.

Objections to the Claims

Claim 1 has been objected to as containing a redundant recitation of a propagation constant difference of 1×10^{-4} rad/ μm or smaller. Applicants have amended claim 1 to eliminate the redundancy and respectfully request that this objection be withdrawn.

Claim Rejections

Claims 1 and 15-22 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 6,701,046 to Pianciola *et al.* (“Pianciola”) in view of U.S. Pat. Pub. No. 2002/0136508) to Donno *et al.* (“Donno”). Applicants traverse this rejection.

The combination of Pianciola and Donno does not disclose or suggest at least wherein in the fusion-elongated portion, each of the plurality of optical fibers tapers to a respective narrower outer diameter relative to an outer diameter of the optical fiber outside the fusion-elongated portion, as recited in claim 1.

Pianciola discloses pre-tapering only the standard optical fiber to decrease the propagation constant difference between the standard optical fiber and the polarization maintaining optical fiber (column 8, lines 13-15). Donno does not cure the deficiencies of Pianciola.

Donno discloses a method for making a splice between two optical fibers which are different from each other, which includes modifying the cross section of the first fiber along a portion of predetermined length, in such a way that the propagation constant in that portion differs from the propagation constant of the second fiber by less than a first predetermined quantity (paragraph 0028). The first predetermined quantity does not exceed $13 \times 10^{-5}/\mu\text{m}$ (paragraph 0033). Thus, modification of the cross section of one optical fiber is required to reduce the propagation constant to $13 \times 10^{-5}/\mu\text{m}$ in the Donno's method.

On the other hand, a feature of claim 1 is to *taper each of the optical fibers* having optimum transmission characteristics in different wavelength bands to achieve a desired low propagation constant difference when the optical fibers are coupled.

Although substantially 100% coupling is easily realized when a wavelength division multiplexed (WDM) coupler is fabricated with two (or more) optical fibers of the same type, it is difficult to obtain substantially 100% coupling in a coupler fabricated with two (or more) different optical fibers because of a difference in propagation constant therebetween.

Typically, an optical fiber elongation ratio of 75% is required to realize substantially 100% coupling. However, because non-limiting exemplary embodiments of Applicants' invention use optical fibers designed such that the propagation constant difference therebetween is $1 \times 10^{-4} \text{ rad}/\mu\text{m}$ or smaller when the optical fibers are individually fusion-elongated at an elongating ratio in a range of 50%, the propagation constant difference becomes 0 rad/mm in a larger range of the optical fiber elongation ratio. Thus, 100% coupling can be realized within a wider production tolerance.

Since both Pianciola and Donno each disclose modifying the cross section of only one of the optical fibers in the fusion-elongation portion, the combination fails to disclose or suggest the features of claim 1. Even if one of ordinary skill in the art at the time the invention was made had been motivated to combine the references, the combination would not result in the claimed features.

For at least the above reasons, claim 1 is patentable over the combination of Pianciola and Donno. Claims 15-22, which depend from claim 1, are patentable at least by virtue of their dependency.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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